REMARKS

Reconsideration of this application is respectfully requested in view of the above amendments and the remarks contained herein.

STATUS OF CLAIMS AND SUPPORT FOR AMENDMENTS

Upon entry of this amendment, claims 1-5, and 7-28 will be pending in this application.

Support for the amendments to claims 1 and 2 can be found, inter alia, in the specification at paragraph [0019] and paragraph [0039] of the published application. Support for new claim 27 can be found in paragraph [0038] of the published application. Support for new claim 28 can be found in paragraph [0044] of the published application. The remaining amendments and added claims are made to clarify the language of the claims, to place parenthetical features into dependent claims, to use terminology more conventional in U.S. practice and to clarify antecedent basis.

Applicant has amended the specification to introduce section headings normally used in U.S. practice and to clarify the text.

Applicant has also amended Figure 1 of the drawings to clarify the nature of step S3, which is described at paragraph [0031] of the published application.

OBVIOUSNESS REJECTIONS

A. Claims 1-5, and 7-23 over Takeshita et al. in view of Yajima et al.

On pages 2-4 of the Office action dated January 11, 2010, the Office has rejected claims 1-5, and 7-23 under 35 U.S.C. § 103(a) as obvious over U.S. Patent Application No. 5,110,374 (Takeshita et al.) in view of U.S. Patent Application No.

5,049,208 (Yajima et al.). Applicants respectfully traverse this rejection for the reasons given below.

The Office action states:

> Applicants' claims encompass the use of any rare earth-transition metal-boron anisotropic magnet material including rare earth-transition metal-boron anisotropic magnet material <u>including Yajima's final magnet product</u>. Thus, applicants' claims encompass the use of such materials as taught by Yajima including scraps of such materials, that is, <u>the starting material of applicants' claimed process encompasses the finish product taught by Yajima</u>. Finally, it is noted that the Examiner has relied on Yajima only for Yajima's teaching that it is well known that rare earth-transition-boron anisotropic magnetic materials have crystal grain sizes of less than 10 microns which is encompassed by the grain size of less than 1 mm recited in the instant claims and Yajima's teaching that such material has a hard magnetic phase content of greater than 90% by volume (see Table 1, Example 1 and Table 2 Examples 1 and 2), that is, that these limitations recited in applicants' claims are well known.
>
> Applicants' argument that there is no reason to assume that a rare earth-iron-boron material used for making a powder according to Takeshita should have the properties of a product obtained by Yajima's method is not persuasive. The rejection based on the combination of Takeshita in view of Yajima is not based on the assumption that that a rare earth-iron-boron used for making a powder according to Takeshita should have the properties of a product obtained by Yajima's method. <u>Instead, as set forth in the statement of the rejection, the rejection based on the combination of Takeshita in view of Yajima is based on the fact that Yajima '208 teaches that the typical R-TM-B magnet has a crystal grain size of less than 10 micron which is encompassed by the crystal grain size of less 1 mm recited in claim 1</u>.

Office action dated January 11, 2010 at pages 7-8 (emphasis added).

First, the Office has not adequately explained why it believes that one having ordinary skill in this art would have combined the teachings of Takeshita et al. with

those of Yajima et al. Takeshita et al. produces a recrystallized microstructure containing predominantly grains of $R_2 F_{14} B$ phase (e.g., grains 1' of Figures 3(c), 4(c), 5(c), etc.) These grains may have, at their triple points, a phase 2 containing an R-rich phase, where R is a rare earth material.

By contrast, Yajima et al. is directed to a material having a microstructure containing primarily grains of a substantially tetragonal grain structure and, to the extent another phase is present, an auxiliary phase containing amorphous and crystalline R-poor material. See Yajima et al. at column 3, lines 23-26. In light of these completely different microstructures, Applicants submit that it is incumbent on the Office to explain why one of ordinary skill in this art would disregard these differences and combine the reference teachings in the manner suggested by the Office. In particular, Applicants submit that the Office explain why one of ordinary skill in this art would reasonably expect to successfully combine the reference teachings in defiance of the cautioning in Yajima et al., namely:

> Although $Nd_2 Fe_{14} B$ compound is used as the basic compound in both the sintering method and the rapid quenching method, the magnets produced by these methods are not only different in the production method, but also belong to essentially different types of magnet with respect to alloy structure and coercivity-generating mechanism, as described in Oyobuturi (Applied Physics), Vol. 55, No. 2 (1986), page 121. More particularly, the sintered R-Fe-B magnet has a grain size of approximately 10 μm and is of the nucleation type as observed with $SmCo_5$ magnet in which coercivity depends on the nucleation of inverse magnetic domains, if compared to conventional SmCo magnets. On the contrary, the rapidly quenched magnet is of the pinning type as observed with $Sm_2 Co_{17}$ magnet in which coercivity depends on the pinning of magnetic domain walls due to the extremely fine structure of fine particles of from 0.01 to 1 μm in size being surrounded by an amorphous phase which is richer in Nd than $Nd_2 Fe_{14} B$ compound (see J. Appl. Phys., 62(3), Vol. 1 (1987), pages 967-971). Thus any approach

> for improving the properties of these two types of magnets must first take into account the difference of coercivity-generating mechanism.

Yajima et al., column 2, lines 37-61. Yajima et al. use a rapid quenching process to obtain the desired material. See Yajima et al. at column 6, lines 65-66. Takeshita et al., by contrast, by casting the alloy into an ingot. See Takeshita et al. at column 10, lines 44-53. The portion of Yajima et al. quoted above makes clear that not all Nd_2 F_{14} B alloys are equivalent or interchangeable, so that it is incorrect for the Office to take the position that the microstructure of the Yajima et al. material is inherent in, or typical of, Nd_2 Fe_{14} B alloys, or indeed of R_2 F_{14} B alloys, including those disclosed in Takeshita et al.

Second, the Office appears to take the position that it would have been obvious to use the magnetic product of Yajima et al. as a starting material in the process of Takeshita et al., and that the result of this combination would be the claimed invention. However, there is nothing in Takeshita et al. to suggest that the process disclosed therein could reasonably be expected to function using such a starting material. To the contrary, as explained above, Takeshita et al. use as a starting material either cast ingot (which one of ordinary skill in this art would reasonably expect to be isotropic, absent some suggestion otherwise in Takeshita et al.), or if the cast ingot is somehow exposed to plastic deformation prior to treatment, Takeshita et al. use a homogenization treatment. See Takeshita et al. at column 10, lines 54-64. Again, one of ordinary skill in this art would reasonably expect that the result of such processing would be an isotropic starting material. Because it is the Office's burden to establish a *prima facie* case of obviousness, the Office should explain why one of ordinary skill in this art would expect that the process of

Takeshita et al. , which uses isotropic starting materials, would be expected to function with an anisotropic starting material. Again, the Office does not explain why one of ordinary skill in the art would use a product having grains separated by an R-poor auxiliary phase as a starting material in a process intended to produce grains having an R-rich phase at the triple points. Nothing in Takeshita et al. suggests this outcome, or that the process disclosed therein could convert such a starting material into such a product.

Third, Yajima et al. discloses the production of both isotropic and anisotropic magnets. See Yajima et al. at column 5, lines 39-59. The Office has not explained why one having ordinary skill in this art would select the anisotropic magnet of Yajima et al. for feeding to the process of Takeshita et al. Applicants submit that such a worker would, in the absence of some specific teaching in the references, have been motivated to use the isotropic products of Yashima et al. in preference to the anisotropic products because Takeshita et al. use isotropic feed stocks. This assumes, of course, that such a worker would even have been motivated to combine references in this manner, which Applicant disputes for the reasons given above. If such a combination of references were to be made, the result would be the feeding of an isotropic feed stock, which is not Applicants' claimed invention.

B. Claims 1-5, and 7-23 over Takeshita et al. in view of either Kim or Kaneko et al. further in view of Yajima et al.

On pages 4-7 of the Office action dated January 11, 2010, the Office has rejected claims 1-5, and 7-23 under 35 U.S.C. § 103(a) as obvious over Takeshita et al. in view of either U.S. Patent Application No. 5,091,020 (Kim) or U.S. Patent

Application No. 6,149,861 (Kaneko et al.) in view of Yajima et al. Applicants respectfully traverse this rejection for the reasons given below.

The Office action states:

> Kim '020 and Kaneko '861 each teach the concept of recycling scrap and or scrap sintered $R_2Fe_{14}B$ rare earth-transition metal-boron alloy (Abstract of each) and that the recycled rare earth-transition metal-boron alloy is used in place of new rare earth-transition metal-boron alloy powder (Kim '020, column 1, lines 60 to 64 and Kaneko '861, column 2, lines 14 to 28) as recited in claims 1 and 2. Kaneko '861 also teaches that the concept of recycling rare earth-transition metal-boron alloy is motivated by economics and environmental concerns (column 2, lines 14 to 28). <u>Thus, the concept of recycling rare earth-transition metal-boron alloy is well known</u>.

Office action dated January 11, 2010 at page 5 (emphasis added). The Office goes on to state:

> The claims and Takeshita '374 differ in that Takeshita '374 teaches the use of new rare earth-transition metal-boron alloy in the disclosed HDDR process and not scrap rare earth-transition metal-boron alloy as recited in the claims. Further, Takeshita '374, Kim '020 and Kaneko '861 are each silent as to the crystal grain size of the R-TM-B alloy.
>
> However, one of ordinary skill in the art at the time the invention was made would have considered the invention to have been obvious because such a person would have been motivated to substitute scrap rare earth-transition metal-boron alloy for the new rare earth-transition metal-boron alloy as the starting material in Takeshita '374's process for economic and environmental reasons as taught by each of Kim '020 and Kaneko '861. The results of such a substitution are reasonably predictable.

Office action dated January 11, 2010 at page 6.

First, the mere fact that the Office is able to identify a reference which disclose the recycling of magnetic materials does not justify a conclusion that it

would have been obvious to one of ordinary skill in the art to use any recycled magnet materials as a feedstock to some hybrid process obtained by (in Applicants' view, improperly) combining the process of Takeshita et al. and Yajima et al. With regard to Kaneko et al., the reference discloses a process, not for grain refinement, as is disclosed in Takeshita et al., but for pulverizing and acid washing a sintered magnet. Kaneko et al. states:

> In the acid washing that is performed in order to remove the carbon and O_2 components from the above-mentioned sintered magnet <u>and to dissolve away the R-rich and B-rich boundary phases</u>, it is preferable to add an acetic acid aqueous solution or the like as an acid solution, and it is preferable for the pH of the acid solution to be from 2.0 to 5.0.

Kaneko et al. at column 3, lines 14-20 (emphasis added). Kaneko et al. therefore is fundamentally concerned with <u>removing</u> the R-rich and B-rich boundary phase from the particles.

By contrast, Takeshita et al. is concerned with the opposite effect. Takeshita et al. states:

> Further, in the magnet powders produced according to the above methods, <u>the fact that R-rich phase and R-rich amorphous phase exist at the grain boundaries of crystal grains of the $R_2Fe_{14}B$ phase in such a manner as to be surrounded thereby is considered to be responsible for greater coercivities</u>. Accordingly the existence of the grain boundary phase has reduced the percentage by volume of $R_2Fe_{14}B$ phase, to thereby lower the value of magnetization of the magnetic powder.

Takeshita et al., column 3, lines 32-42 (emphasis added). Takeshita et al. is therefore concerned with <u>preserving</u> the R-rich boundary phases, not dissolving them in an acid wash, as required by Kaneko et al. Applicants submit that a

rejection that relies on (1) a reference that produces and relies on the presence a R-rich boundary phase (Takeshita et al.) with (2) a reference that produces an R-poor boundary phase (Yajima et al.) and with (3) a reference that requires an acid wash dissolution of R-rich boundary phase is the result of the combination of fundamentally incompatible references, and for at least this reason does not establish a *prima facie* case of obviousness.

With respect to Kim, Applicants have been unable to locate any disclosure therein that indicates that the "scrap" or "dross" used as a starting material is anisotropic. If the Office is relying on some theory of inherency for the alleged teaching that Kim discloses recycling of an anisotropic starting material (as recited in Applicants' claims) then Applicants respectfully request that the Office explain the basis for expecting that the starting materials of Kim must necessarily be anisotropic, in accordance with *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993); MPEP § 2112. If the Office is relying on personal knowledge of an Office employee, then this should be placed into the record in accordance with 37 C.F.R. § 1.104(d)(2), so that Applicants have a fair opportunity to address any such declaration. Absent some explanation as to how Kim discloses an anisotropic starting material, Applicants submit that combination of Kim with Takeshita et al. and Yajima et al. adds nothing to the disclosure of those references with respect to the use of an anisotropic starting material, and the combination of references fails to establish a *prima facie* case of obviousness for the reasons given above with respect to the obviousness rejection over Takeshita et al. and Yajima et al. Accordingly, this rejection should be withdrawn.

CONCLUSION

Applicants submit that this application is in condition for immediate allowance, and an early notification to that effect is respectfully requested. If the Examiner has any questions about this application, or believes that any issues remain to be resolved, the Examiner is respectfully requested to contact the undersigned to arrange for a personal or telephonic interview to resolve these issues prior to the issuance of another Office action.

The Director is hereby authorized to charge any appropriate fees under 37 C.F.R. §§ 1.16, 1.17 and 1.20(d) and 1.21 that may be required by this paper, and to credit any overpayment, to Deposit Account No. 02-4800.

Respectfully submitted,

BUCHANAN INGERSOLL & ROONEY PC

Date: April 12, 2010

By: ______________________
Bruce D. Gray
Registration No. 35799

Customer No. 21839
703 836 6620